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Immediate Water Pollution Control Needs Lower Red River Basin Oklahoma, Texas, Arkansas, and Louisiana

Federal Water Pollution Control Administration, Dallas, Texas

Apr 67

PB 266 390

IMMEDIATE WATER POLLUTION CONTROL NEEDS

LOWER RED RIVER BASIN

OKLAHOMA, TEXAS, ARKANSAS, AND LOUISIANA

U. S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
SOUTH CENTRAL REGION
DALLAS, TEXAS 75202

APRIL 1967

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16. ABSTRACT

The purpose of the report is to focus attention on known sources of pollution in this area and to provide a priority for action to correct existing problems and to prevent future problems.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
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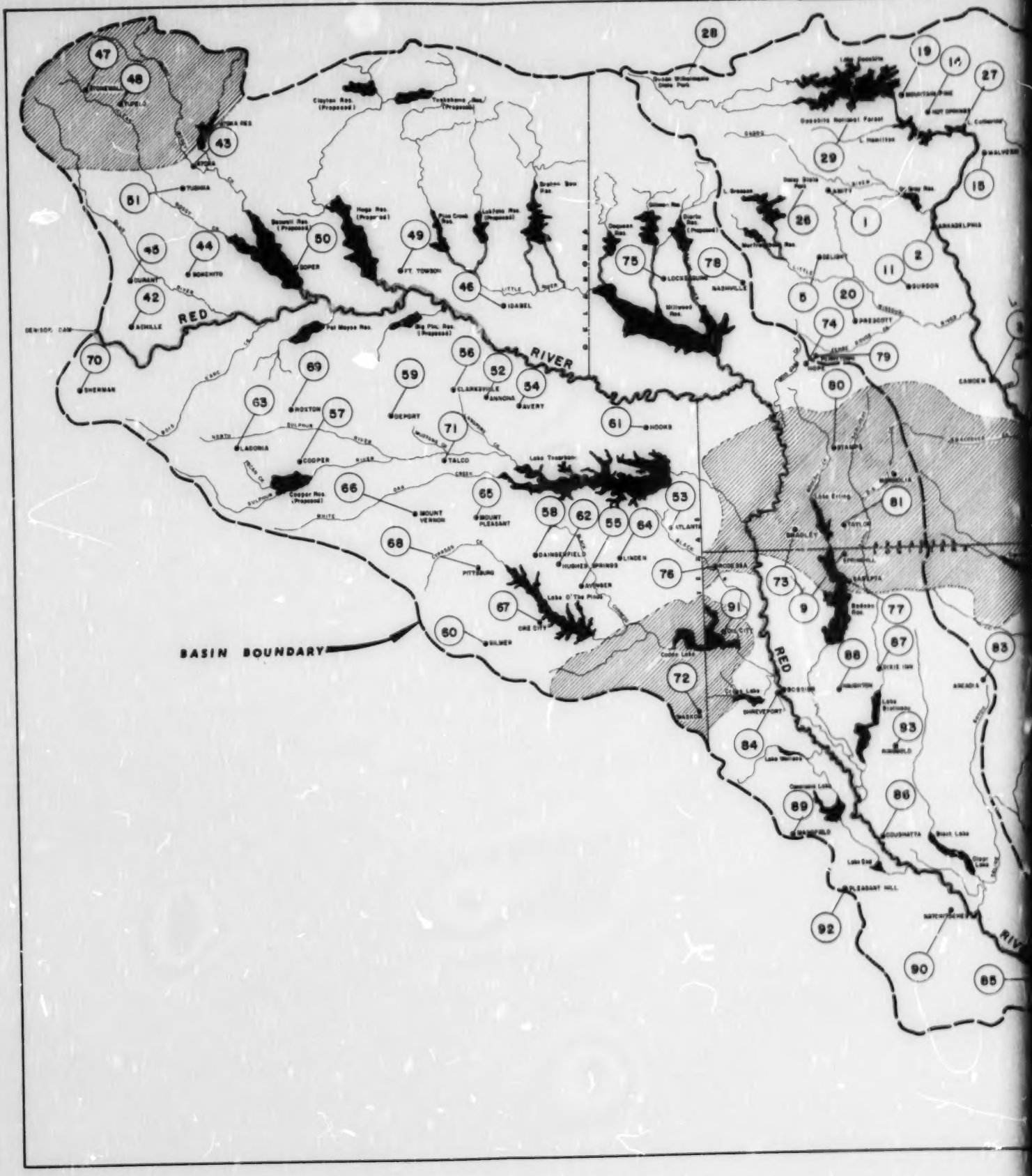
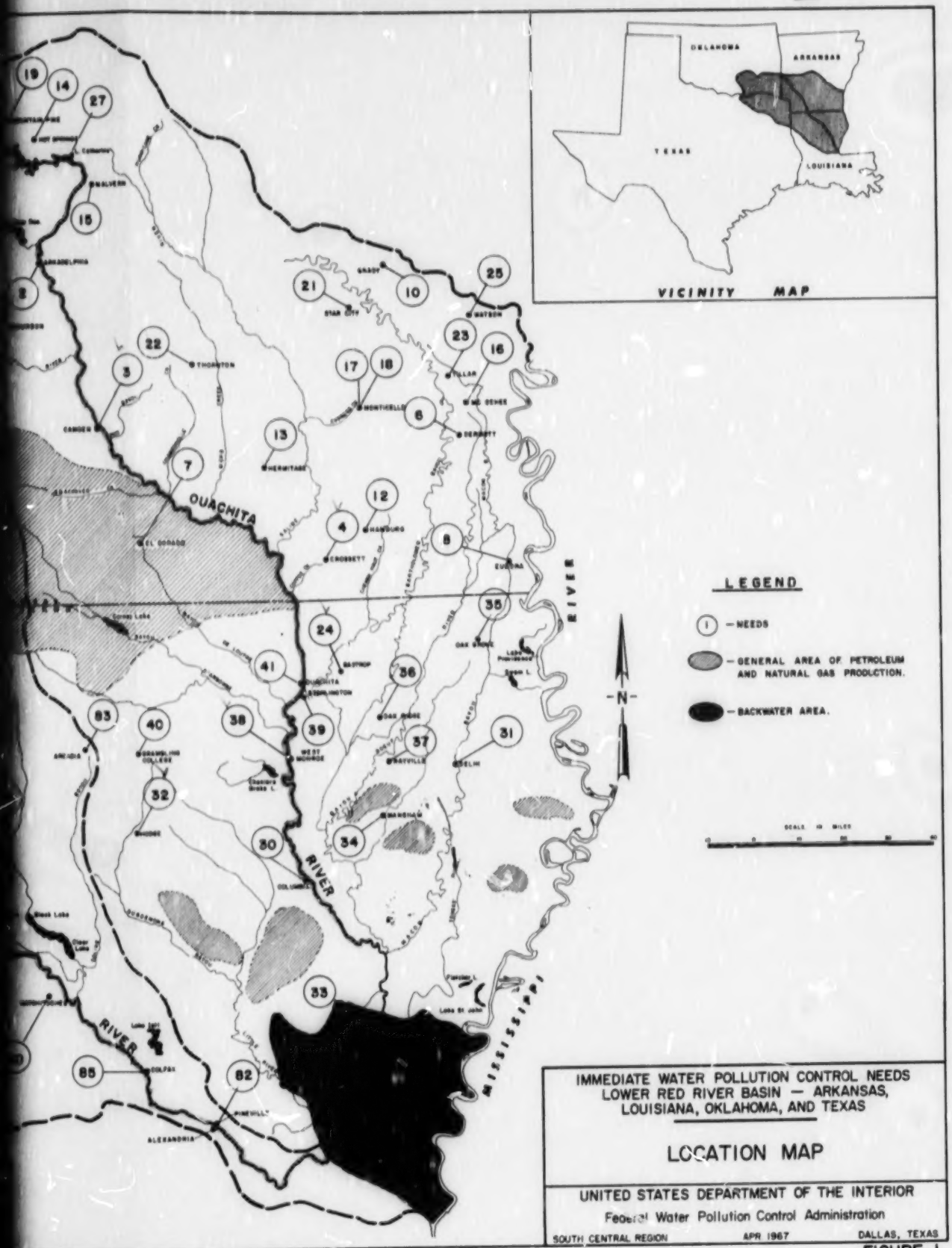
I. Introduction

The purpose of this report is to focus attention on known sources of pollution and to provide a priority for action to correct the existing water pollution problems and prevent future problems in the Lower Red River, (see Figure 1), an interstate stream and its tributaries. This report is based on compilations of available data of the Federal Water Pollution Control Administration, South Central Region, and the pollution control agencies of Arkansas, Louisiana, Oklahoma, and Texas. No detailed water quality surveys or engineering studies were carried out for the preparation of this report.

The findings of this report are based on the best information available at this time on water quality conditions and immediate and potential pollution abatement needs. The omission of any particular town, industry, or other establishment from this report does not imply that an immediate or potential pollution abatement need may not exist in that particular area. Priorities listed are based solely on an evaluation of the Lower Red River Basin and not on a relative basis with other basins in the South Central Region.

Authority is given in Section 3 (a) of the Federal Water Pollution Control Act, as amended, for the preparation or development of comprehensive programs for eliminating or reducing the pollution of interstate waters and tributaries thereof and improving the sanitary conditions of surface and underground waters. This report, by describing the immediate needs for controlling water pollution in the Lower Red River Basin, represents another step in the development of a comprehensive program to control water pollution in this basin.


BASIN BOUNDARY
RED RIVER
RED
Clayton Res. (Proposed)
Tuskahoma Res. (Proposed)
Broken Bow Res.
Hugo Res. (Proposed)
Pine Creek Res.
Luksahoma Res. (Proposed)
Sardis Res. (Proposed)
Millwood Res.
Wallace Lake
Caddo Lake
Lake Texarkana
Lake O' The Pines
Lake Bistineau
Lake Erling
Lake Providence
Sparta Res.
Bodcau Res.
Cooper Res. (Proposed)
Big Pine Res. (Proposed)
Pat Mayse Res.
Ouachita Nat'l Forest
Caddo Nat'l Forest
Sabine Nat'l Forest
Kisatchie Nat'l Forest
Red River Nat'l Wildlife Refuge
Overton Brooks Res.
Lake Bruin
Lake St. John
Lake Concordia
Lake Providence
Lake Chicot
Lake Dick
Lake Ophelia
Lake Saint Peter
Lake Long
Lake Black
Lake Bruin
Lake Saint



IMMEDIATE WATER POLLUTION CONTROL NEEDS
LOWER RED RIVER BASIN — ARKANSAS, LOUISIANA, OKLAHOMA, AND TEXAS

LOCATION MAP

UNITED STATES DEPARTMENT OF THE INTERIOR
Federal Water Pollution Control Administration
SOUTH CENTRAL REGION APR 1967 DALLAS, TEXAS

FIGURE 1

II. Summary of Immediate Pollution Control Needs

Pollution problems in the Lower Red River Basin, as indicated by high chloride and sulfate concentrations, high color, foaming, rapid temperature variations, and oxygen depletion, include damages to municipal and industrial water supply, propagation of fish life, and recreation uses as well as degradation of aesthetics.

Top priority should be given to controlling the natural mineral sources by implementing the recommendations of the Ark-Red River Basins Water Quality Conservation Project detailed in the Immediate Water Pollution Control Needs report, Upper Red River Basin. These and other immediate water pollution control needs are listed in the following tabulation and grouped into categories: waste treatment, flow regulation, other pollution control practices, institutional practices and research. Location designations refer to Figure 1.

Location	Responsibility	Need	Priority
Waste Treatment			
Arkansas (Ouachita River Subbasin)			
1	City of Amity	Primary & secondary treatment	B
2	City of Arkadelphia	Secondary treatment	A
4	City of Crossett	Enlarge sewage facilities	B
5	City of Delight	Primary & secondary treatment	B
6	City of Dermott	Expansion of primary & secondary treatment	B
7	Refineries and Chemical Manufacturers in El Dorado, Ark. Area	Provide improved waste treatment and water pollution control measures	A
8	City of Eudora	Secondary treatment	B
10	Town of Grady	Primary & secondary treatment	B
11	City of Gurdon	Enlarge primary & secondary treatment	A

Location	Responsibility	Need	Priority
Waste Treatment (Continued)			
Arkansas (Ouachita River Subbasin)			
12	City of Hamburg	Enlarge primary & secondary treatment	A
13	Town of Hermitage	Primary & secondary treatment	B
14	City of Hot Springs	Infiltration control works	A
15	City of Malvern	Infiltration control works	A
16	City of McGehee	Expansion of secondary treatment	B
17	City of Monticello	Expansion of existing plant	B
18	State of Arkansas Monticello A&M College	Expansion of secondary treatment	B
19	Town of Mountain Pine	Replacement of existing plant with primary & secondary treatment	B
20	City of Prescott	Expansion of primary & secondary treatment	A
21	City of Star City Plant #2	Expansion of primary & secondary treatment	A
22	Town of Thornton	Primary & secondary treatment	B
23	Town of Tillar	Primary & secondary treatment	B
25	Town of Watson	Primary & secondary treatment	B
26	State of Arkansas Daisy State Park	Primary & secondary treatment	B

Location	Responsibility	Need	Priority
Waste Treatment (Continued)			
Arkansas (Ouachita River Subbasin)			
27	State of Arkansas Lake Catherine State Park	Primary & secondary treatment	B
28	State of Arkansas Queen Wilhelmania State Park	Primary & secondary treatment	B
29	Ouachita National Forest, 4 Rec. Areas	Secondary & septic tanks treatment	B
Louisiana (Ouachita River Subbasin)			
30	Village of Columbia	Primary & secondary treatment	A
31	Town of Delhi	Primary & secondary treatment	A
32	Village of Hodge	Primary & secondary treatment	A
33	Town of Jonesville	Primary & secondary treatment	A
34	Town of Mangham	Primary & secondary treatment	B
35	Town of Oak Grove	Primary & secondary treatment	A
36	Village of Oak Ridge	Primary & secondary treatment	B
37	Town of Rayville	Primary & secondary treatment	A
38	Town of West Monroe	Primary & secondary treatment	A
39	Commercial Solvents Corporation Sterlington, La.	Provide improved biologic and chemical treatment	A

Location	Responsibility	Need	Priority
Waste Treatment (Continued)			
Louisiana (Ouachita River Subbasin)			
40	State of Louisiana Grambling College at Grambling	Expansion of primary & secondary treatment	B
	Village of Grambling	Expansion of primary & secondary treatment	B
41	State of Louisiana Ouachita Sanitorium	Primary & secondary treatment	A
Oklahoma (Red River Basin)			
42	Town of Achille	Primary & secondary treatment	B
43	City of Atoka	Expansion of existing plant and sewage facilities	A
44	Town of Bokchito	Primary & secondary treatment	B
45	City of Durant	Expansion of existing plant and sewage facilities	A
46	Idabel Poultry Processing Plant Idabel City, Okla.	Provide primary & secondary treatment	B
47	Town of Stonewall	Expansion of existing plant and sewage facilities	A
48	City of Tupelo	Primary & secondary treatment	B
49	Town of Fort Towson	Primary & secondary treatment	B
50	Town of Soper	Primary & secondary treatment	B
51	Town of Tushka	Primary & secondary treatment	B

Location	Responsibility	Need	Priority
Waste Treatment (Continued)			
Texas (Red River Basin)			
52	Town of Annona	Primary & secondary treatment	B
53	City of Atlanta	Expansion of existing plant and sewage facilities	A
54	Town of Avery	Primary & secondary treatment	B
55	Town of Avinger	Expansion of secondary treatment	B
56	City of Clarksville	Replace existing obsolete overloaded sewage treatment plant	A
57	City of Cooper	Replace existing obsolete overloaded sewage treatment plant	A
58	Town of Daingerfield	Expansion of existing plant - primary & secondary treatment	A
	Industries in Daingerfield Area	Provide improved treatment for industrial wastes	A
59	Town of Deport	Add secondary treatment	A
60	City of Gilmer	Expansion to existing plant - primary & secondary treatment	A
61	Town of Hooks	Primary & secondary treatment	B
	U. S. Army Red River Arsenal near Hooks, Texas	Study to determine needed improvement for industrial waste treatment system	A
62	Town of Hughes Springs	Replace existing obsolete overloaded sewage treatment plant	A

Location	Responsibility	Need	Priority
Waste Treatment (Continued)			
Texas (Red River Basin)			
63	Town of Ladonia	Replace existing obsolete overloaded sewage treatment plant	A
64	Town of Linden Plant #1	Add secondary treatment	A
65	City of Mt. Pleasant S. side plant	Expansion & addition to existing plant - primary & secondary treatment	A
66	Town of Mt. Vernon	Addition to existing plant - primary & secondary treatment	A
67	City of Ore City	Addition to existing plant - primary & secondary treatment	B
68	City of Pittsburg	Addition - primary & secondary treatment	A
69	Town of Roxton	Expanding unit for primary & secondary treatment	A
70	City of Sherman	New plant to supplement old plant - primary & secondary treatment	A
71	City of Talco	Expansion to existing plant - secondary treatment	A
72	City of Waskom	Expansion to existing plant - secondary treatment	A
Arkansas (Red River Basin)			
73	Town of Bradley	Primary & secondary treatment	B
74	City of Hope	Sewage facilities expansion	B
75	Town of Lockesburg	Primary & secondary treatment	B

Location	Responsibility	Need	Priority
Waste Treatment (Continued)			
Arkansas (Red River Basin)			
78	City of Nashville	Primary & secondary treatment	B
79	Town of Perrytown	Primary & secondary treatment	B
80	City of Stamps	Expansion for existing plant - secondary treatment	B
81	City of Taylor	Expansion for existing plant - secondary treatment	B
Louisiana (Red River Basin)			
76	Village of Rodessa	Primary & secondary treatment	A
77	Village of Sarepta	Primary & secondary treatment	A
82	City of Alexandria	Primary & secondary treatment	A
	City of Pineville	Primary & secondary treatment	A
	Veterans Administration Hospital near Pineville	Connect to Pineville sewerage system	A
	State of Louisiana (Central Louisiana State Hospital)	Connect to Pineville sewerage system	A
	State of Louisiana (State Colony for Girls) at Pineville	Connect to Pineville sewerage system	A
	State of Louisiana (State Industrial School for Boys) at Pineville	Connect to Pineville sewerage system	A

Location	Responsibility	Need	Priority
Waste Treatment (Continued)			
Louisiana (Red River Basin)			
	England Air Force Base (USAF) at Alexandria	Primary & secondary treatment	A
83	Town of Arcadia	Primary & secondary treatment - replace old plant	A
84	Refineries and industries not connected to municipal sewer system in the Shreveport, La. area	Provide improved treatment for removal of greases, oils, and toxic materials or provide suitable pretreatment and discharge to municipal sewerage system	A
	City of Bossier City	Primary & secondary treatment	A
	Barksdale Air Force Base, USAF, near Bossier City	Connect to Bossier City system	A
	City of Shreveport	Primary & secondary treatment	A
85	Town of Colfax	Primary & secondary treatment	A
86	Town of Coushatta	Primary & secondary treatment	A
87	Village of Dixie Inn	Primary & secondary treatment	B
88	Village of Haughton	Primary & secondary treatment	B
89	City of Mansfield	Expansion for primary & secondary treatment	A
90	City of Natchitoches	Primary & secondary treatment	A
91	Town of Oil City	Primary & secondary treatment	B

Location	Responsibility	Need	Priority
Waste Treatment (Continued)			
Louisiana (Red River Basin)			
92	Town of Pleasant Hill	Primary & secondary treatment	B
93	Town of Ringgold	Primary & secondary treatment	A
3,4,9,24, 32 & 38	Seven paper mills including: International Paper Company, Camden, Ark. Springhill, La. Bastrop, La. (2)	Improve control schedule for waste releases to minimize effect or color and initiate plans for reducing color in effluent to an acceptable level	A
	Continental Can Co. Hodge, La.		
	Georgia-Pacific Corp. Crossett, Ark.		
	Olin Mathieson Chemical Corp. West Monroe, La.		
Flow Regulation			
Dam sites in Basin	Corps of Engineers	Provide regulated flows to maintain temperature and oxygen levels most ideal for the type of fisheries sustained in the dam tail waters	A
Narrows Dam	Corps of Engineers	Provide for additional storage in Lake Greeson reservoir to maintain trout fishery year round	B
Other Pollution Control Practices			
Upper Red River Basin*	Corps of Engineers and State and Local Water Pollution Control Agencies	Carry out the recommendations of the Ark-Red River Water Quality Conservation Project to reduce the salt content of the Red River to acceptable limits for municipal and industrial uses	A

Location	Responsibility	Need	Priority
Other Pollution Control Practices (Continued)			
Oil & gas producing areas	Oil and gas drilling companies	Provide for subsurface disposal of oil field brines	A
* See Immediate Needs Report - Upper Red River Basin			
Basinwide	States of Oklahoma, Texas, Arkansas, Louisiana and USDA	Promote improved agricultural practices for control of silt laden runoff and for control of use of toxic pesticides and herbicides by education	B
Oil & gas producing areas	States of Arkansas, Texas, Oklahoma & Louisiana	Continued rigid enforcement of laws on proper disposal of oil field brines & other wastes	A
Institutional Practices			
Basinwide	FWPCA and States of Arkansas, Louisiana, Texas and Oklahoma	Should, in cooperation with other interested organizations, establish and promote an effective comprehensive water pollution control and water quality management program in the basin	B
Basinwide	States of Arkansas, Louisiana, Texas and Oklahoma	Should establish water quality standards for interstate and intrastate streams in the Lower Red River Basin	B
Basinwide	States of Arkansas, Louisiana, Texas and Oklahoma	Should consider the need for expansion of the water quality monitoring network and surveillance program (including treatment plant operation)	A

Location	Responsibility	Need	Priority
Institutional Practices (Continued)			
Basinwide	States of Arkansas, Louisiana, Texas and Oklahoma	Should consider legislation to provide appropriations for state participation in grants for construction of sewage treatment works	B
Basinwide	States of Arkansas, Louisiana, Texas, and Oklahoma	Preparation and maintenance of a complete industrial waste discharge inventory for industries not connected to municipal treatment systems	B
Research			
Basinwide	FWPCA, State & Federal Fish & Wildlife Agencies, Corps of Engineers	Provide detailed model studies of the Red River to determine the effect of the proposed navigation dams on the other beneficial uses of the stream	B
Backwater Area	FWPCA	Initiate model simulation studies of the backwater regimen to prevent further damage to the recreational and fish and wildlife uses by navigational and flood control activities	B
Basinwide	Pulp and paper industries, universities & FWPCA	Develop means to eliminate color problems from paper mill effluent	B
Dam sites in basin	State and Federal Wilflife & Fisheries Agencies, FWPCA	Use model simulation studies to determine optimum flow regimens to maintain temperature & oxygen levels most ideal for the type of fisheries sustained in the dam tail waters. These studies	B

Location	Responsibility	Need	Priority
Research (Continued)		should also indicate the effects of the dams and reservoirs on the lower reaches of the rivers.	

III. Immediate Control Needs

Various measures are needed to control existing and potential pollution of the Lower Red River and its tributaries. These measures will reduce the high chloride and sulfate content, lower odor, minimize foaming, enhance aesthetics, increase oxygen content, and reduce concentrations of toxic materials for the protection of water uses within the basin. These include municipal and industrial water supply, propagation of fish and wildlife, recreation and irrigation.

The actions recommended here, though not all encompassing, are, however, prerequisite to good water quality planning and should be included in local, state and federal programming for water pollution control. Background for these immediate needs is summarized in Chapter VI.

Waste Treatment

New waste treatment plants consisting of primary and secondary treatment need to be provided by the following which are presently discharging untreated sewage:

1. Columbia, Delhi, Hodge, Jonesville, Oak Grove, Rayville, West Monroe, State of Louisiana - Ouachita Sanitorium, all in the Ouachita River subbasin in Louisiana.

2. Alexandria, Pineville, England Air Force Base, Arcadia, Bossier City, Shreveport, Colfax, Conshatta, Natchitoches, and Rodessa, all in the mainstem Red River Basin in Louisiana.

Expansion, renovation, or replacement of existing plants providing primary and secondary treatment are needed by the following:

1. Gurdon, Hamburg, Prescott, Star City (#1), Arkansas, in the Ouachita River subbasin.

2. Atoka, Durant, and Stonewall, Oklahoma; Atlanta, Clarksville, Cooper, Daingerfield, Gilmer, Hughes Springs, Linden (#1), Mount Pleasant (South Side), Mount Vernon, Pittsburg, Roxton, Sherman, Talco and Waskom, Texas; and Mansfield, Louisiana, all in the mainstem Red River Basin.

Addition or expansion of secondary treatment facilities is needed at Arkadelphia, Arkansas; Avinger and Deport, Texas; and Mansfield, Louisiana, where presently only primary treatment or inadequate secondary treatment is provided.

Control of infiltration is needed at Hot Springs and Malvern, Arkansas, to alleviate hydraulic overloading thus increasing the treatment efficiency of the existing primary and secondary treatment facilities.

The sewage treatment facilities for the City of Pineville, Louisiana, consistent with good area water pollution control planning practices, should be designed to include adequate treatment for sewage from the Veterans Administration Hospital, Central Louisiana State Hospital, Louisiana Colony for Girls, and the Louisiana Industrial School for Boys. Connections of these institutions to the Pineville system will reduce the pollution caused by present releases of untreated or inadequately treated sewage. Likewise, Barksdale Air Force Base should be connected to the Bossier City system to eliminate the discharge of untreated sewage from the Federal activity.

New or expanded treatment facilities are needed by at least 44 other communities, 3 state parks, 1 National Forest, and 2 state institutions.

Most industries in the Lower Red River Basin which would discharge wastes resulting in pollution problems are located in or near municipalities and are connected to municipal sewer systems. However, a number of industries not connected to municipal systems need to provide improved water pollution control or treatment measures. Seven paper mills need to improve waste treatment measures provided to remove color. Additional research and development is needed to reduce the cost of removing color from treated paper mill waste effluents (see Research below).

Several petroleum refining, petrochemical, and chemical manufacturing plants are located in the Lower Red River Basin. Improved waste treatment is needed by various plants located in the Shreveport, Louisiana, area, El Dorado, Arkansas, area and at the Sterlington, Louisiana, plant of Commercial Solvents Corporation.

The industries in the Daingerfield, Texas, area, principally steel manufacturing, need to improve treatment of industrial wastes.

The U. S. Army should undertake a study of the industrial waste treatment system at Red River Arsenal, Texas, with the view of determining the measures needed to provide adequate treatment.

The Idabel Poultry Processing Plant at Idabel, Oklahoma, needs to provide primary and secondary treatment for the wastes resulting from poultry processing.

This list of waste treatment needs is not considered all inclusive and does not reflect needs due to future obsolescence, expanded or changed water uses.

Flow Regulation

The U. S. Army Corps of Engineers should provide regulated flows from the series of hydroelectric dams on the Red and Ouachita Rivers to maintain sufficient low flows of suitable quantities and qualities to support particular fisheries in the dam tailwaters. Additional storage is needed in Lake Greeson, Arkansas, to maintain a year-round trout fishery in the Narrows Dam Tailwaters.

Other Pollution Control Practices

The immediate need in the mainstem area of the Lower Red River Basin having the highest priority is the improvement of the quality of the water upstream from Denison Dam at the head of the area. The Corps of Engineers should be authorized to undertake the remedial measures recommended in their report to control the natural salt pollution, while state and local water pollution control agencies should continue to carry out the oil field brine control program recommended in the Public Health Service (predecessor to FWPCA) Report on Water Quality Conservation in the Arkansas-Red River Basins. (Details of this proposed program are presented in the FWPCA report on Immediate Water Pollution Control Needs - Upper Red River Basin.)

Control of oil field brines should be improved in the Ouachita River subbasin area, particularly along Little River, Bayou DeL'Outre, Smackover Creek, and Bayou D'Orbonne. All operating wells should be provided with effective brine reinjection systems by their owners.

Until such time as color removal or control is provided by the paper mills in the basin, releases of treated waste should be regulated to minimize pollutional damages.

Continued surveillance and enforcement actions by the states are needed to control water pollution resulting from oil and gas field activities. Control measures required include, but are not limited to, reinjections of brines, elimination of earthen pits and plugging of abandoned wells.

The U. S. Department of Agriculture, in cooperation with State Extension Services, should promote better soil conservation practices to reduce siltation in streams draining agricultural areas, and provide further education and training in the proper application and use of pesticides. The use of highly toxic and/or persistent pesticides should be strictly regulated by the state.

Institutional Practices

An effective comprehensive water pollution control and water quality management program is needed in the basin. The Federal Water Pollution Control Administration and the basin states should establish a continuing program to coordinate such a program including consideration of the effects of impoundments, highways, levees, flood control, and soil conservation works on water quality, stream ecology, and water pollution control.

To strengthen the states' position on prevention, control, and abatement of stream pollution, water quality standards are needed on both interstate and intrastate streams. State participation is needed in the waste treatment plant construction grants program to accelerate the construction of needed improvements. Increased surveillance and operation inspection of sewage and industrial waste treatment plants are needed to locate and identify existing or potential serious pollution problems. For more rigid control over industrial pollution and aid in solving complex stream quality problems, a complete and up-to-date inventory is needed of industrial waste discharges to basin streams, listing quantity and quality of effluent and other pertinent data.

Research

There is a need for a detailed model study to determine the effects of the proposed navigation dams on the Red River on all other beneficial uses of the stream. Model simulation studies of the annual backwater overflow regimen in the backwater area near the confluence of the Red and Mississippi Rivers should also be initiated by the Federal Water Pollution Control Administration.

The series of hydroelectric dams constructed or planned in Oklahoma and Arkansas should be designed and operated to support fisheries in the dam tailwaters to make maximum use of these facilities; flow regimens should be determined by the Corps of Engineers, Federal Water Pollution Control Administration, and state and federal water pollution control agencies through model studies so that recommendations can be made regarding the construction of these dams.

The control of color in the treated paper mill effluent has been a perplexing problem for a number of years. Research and development is needed to provide a less expensive process for color removal than that currently available. This research should be a coordinated effort of the paper industry, FWPCA, and state water pollution control agencies, utilizing the resources of all as well as university research programs. This research is of prime importance to this basin.

IV. Costs

The estimated cost of pollution control measures listed in the summary table is shown in the following tabulation:

Item	Estimated Cost
Municipal and Industrial Waste Treatment Facilities	
New treatment facilities	$34,090,000
Expansion of treatment facilities	11,502,000
Industrial pollution control	3,620,000
Sub Total	$49,212,000
State Institutions and Parks	
New treatment facilities	$ 654,000
National Forest	
Addition of new treatment facilities	$ 300,000
Federal Installations	
New treatment facilities	$ 630,000
TOTAL	$50,796,000

Of the total cost, approximately $34,877,000, exclusive of research costs, would be needed for control measures listed under priority "A" in the summary table.

V. Recent Progress in Pollution Control

A number of Federal, state, and local water pollution control efforts have been undertaken in the Lower Red River Basin resulting in improvements to water quality. Chlorides and dissolved solids concentrations have been reduced in the Ouachita River and various of its tributaries. Dissolved oxygen and coliform concentrations have been maintained at more suitable levels than would have existed in the absence of these efforts. Red River has improved in quality, though still not suitable for the needed uses.

Federal Progress in Pollution Control

Through a continuing construction grants program, treatment facilities and appurtenant works have been constructed at 92 towns and cities in the basin since 1958. Under this program, 10 additional projects are under construction and grant offers have been made for facilities at 24 other cities.

State Agencies

The State Water Pollution Control Agencies of Arkansas, Louisiana, Texas, and Oklahoma have been active and have made significant strides in recent years to control water pollution in the basin through surveillance, construction of treatment facilities, training programs, and periodic inspections of treatment plant operation. Intrastate water quality monitoring systems have been provided.

In September 1957, the Arkansas Water Pollution Control Commission, aided by a grant from the U. S. Public Health Service, completed a survey of the sources of pollution in the Arkansas portion of the Ouachita drainage basin. This survey included a study of the quantity and chemical characteristic of wastes from municipal and industrial sources and brines from oil production. These studies provided information to show the extent of adverse effects of pollutional discharges on the receiving stream, and formed a basis upon which the Arkansas Water Pollution Control Commission initiated a pollution abatement program.

The Louisiana Stream Control Commission has regulations to police oil field brine and waste oil disposal granted it under authority of Section 1435, Chapter 3, Part 1, of Title 56, Louisiana Revised Statutes of 1950 (amended 1953). Some improvement has been made in regulating the disposal of oil field wastes.

Arkansas-Red Water Quality Conservation Project

The intensive phase of the project was completed in 1964. A report that delineated the extent of mineral pollution, evaluated available economic benefits from abatement, and recommended various

possible methods of abatement was published in June 1964. The project is currently supporting the States of Arkansas, Oklahoma, and Texas, in an effort to alleviate mineral pollution from man-made sources as well as to conduct several special studies relating to both natural and man-made mineral pollution.

Lower Mississippi River Comprehensive Water Pollution Control Program

The Federal Water Pollution Control Administration has initiated a comprehensive water pollution control program in the Lower Mississippi River Basin. The Lower Red River Basin is included in the program area.

VI. Background

Pertinent Basin Characteristics

The Lower Red River Basin, as shown in figure 1, lies in the States of Oklahoma, Texas, Arkansas, and Louisiana, and extends from Denison Dam at Texoma Reservoir southeastward to the Mississippi River. For the first 241 miles below Denison Dam, the river forms the border between the States of Oklahoma and Texas, and between the States of Arkansas and Texas.

The drainage area of the Red River below Denison Dam is 53,700 square miles, of which 24,200 square miles are in its largest tributary basin, the Ouachita River Basin, in Arkansas and Louisiana. Other major tributary basins are the Blue River, Boggy Creek, and Kiamichi River Basins of Oklahoma; the Little River system of southeastern Oklahoma and southwestern Arkansas; the Sulphur and Cypress River Basins of Texas; and the Loggy and Saline Bayou systems of Louisiana.

The Lower Red River flows a distance of 726 miles through an alluvial valley of the Coastal Plains and discharges into the Atchafalaya and Mississippi Rivers via Old River. A large backwater area of approximately 2,650 square miles occurs in the flat lowlands in the general area of the confluence of the Red-Ouachita and Red-Atchafalaya and Mississippi Rivers.

The climate in the major portion of the Red River Basin is warm and humid with precipitation ranging from 37 inches in the west to 60 inches in the east. Average flows in the mainstem of the Red River vary from 3,800,000 acre-feet per year (5,243 cfs) below Texoma Reservoir to 23,450,000 acre-feet per year (32,390 cfs) at Alexandria, Louisiana.

There are approximately 20 major reservoirs in the Lower Red River Basin, of which 10 are Federal projects constructed for flood control, water supply, hydroelectric power, recreation, and fish and wildlife purposes. The largest of the reservoirs are the Blakeley Mountain (Ouachita) and Millwood Reservoirs in Arkansas, and the Ferrell's Bridge (Lake O'the Pines) and Texarkana Reservoirs in Texas.

The total basin population is about 2.3 million, and the average population density is about 43 per square mile. The largest cities are Shreveport (164,000), Alexandria (40,000), Bossier City (33,000), and Monroe (52,000), Louisiana; Paris (21,000), Sherman (25,000), and Denison (23,000), Texas; Texarkana (50,000), Texas-Arkansas; and El Dorado (25,000) and Hot Springs (28,000), Arkansas.

Many and varied industries contribute to the economy of the basin. Of major significance are the primary metals (iron and steel), petroleum, pulp and paper, lumber, and food and kindred products industries.

Water Quality

The chemical quality of surface waters of the mainstem of the Red River below Denison Dam is generally poor because of the high concentration of dissolved solids, chlorides and sulfates, and high carbonate hardness. Quality of the stream, however, is considerably improved as the river flows eastward and southward toward the Mississippi River. Large tributary rivers having high quality water empty into the Red River and significantly dilute the flows of the mainstem, thus causing a sizeable reduction in the concentration of dissolved solids. Waters of the mainstem are generally turbid, reflecting its high sediment load of sand and clay.

Surface waters of the tributary basins, in general, are of good quality and their chemical constituents are within the Public Health Service Drinking Water Standards.

The following tabulation shows average stream quality data at several locations on the mainstem and major tributaries of the Lower Red River:

	Dissolved Solids (mg/l)	Sulfates (mg/l)	Chlorides (mg/l)	Carbonate Hardness (mg/l)
Red River below Denison Dam	987	243	325	367
Red River at Index, Ark.	678	142	194	267
Red River near Shreveport, La. (Hosston)	513	98	142	212
Red River at Alexandria, La.	428	68	125	165
Little River near Idabel, Okla.	69	4	22	26
South Sulphur R. near Cooper, Tex.	329	52	38	185

	Dissolved Solids (mg/l)	Sulfates (mg/l)	Chlorides (mg/l)	Carbonate Hardness (mg/l)
Ouachita River near Arkadelphia, Ark.	55	7	6	28
Black River at Jonesville, La.	283	12	104	80

Source: U. S. Geological Survey, Water Year 1963

Water resources of the basin are used for municipal and industrial water supply, agricultural water supply, including domestic, irrigation and livestock watering; fish and wildlife propagation; recreational activities; hydroelectric power production; industrial cooling operations; and for final disposal of waste treatment plant effluents. Extensive water quality problems in the mainstem of the Lower Red River and in certain tributaries have seriously curtailed water use.

Present Water Quality Problems

As a result of brine emissions and releases in the Upper Red River Basin, water quality is seriously degraded so as to be unsuitable for general municipal, industrial, and agricultural use in the mainstem of the Lower Red River from Denison Dam to its confluence with Old River.

While the two year average chloride concentration at Index, Arkansas, was only 173 mg/l, 6,709,300 acre-feet of the 15,230,000 acre-feet of water passing this point during this period contained chloride concentrations in excess of the 250 mg/l limit for drinking water established by the Public Health Service. The 8,520,700 acre-feet with chloride concentrations less than 250 mg/l passed this point during short periods of relatively high flow. So, while there is some water of acceptable quality, it is only available during several brief intervals of 20 to 25 days each during the year. In addition to chloride degradation, surface and ground waters of the basin are polluted by sulfates originating in widespread gypsum deposits from the Permian period.

In addition to the natural brine pollution of the mainstem, much oil field brine pollution is evident on various tributaries. The high chloride concentration in tributary waters resulting from past brine releases to the surface in the areas of the basin where extensive petroleum and gas production have taken place precludes their use for municipal, industrial, and agricultural purposes. In many areas, the degradation results as much from leaching of past operations as new

releases. In the Ouachita River Subbasin, the principal tributaries affected by oil field pollution are Smackover Creek, Bayous Del'Outre and D'Arbonne and the Little River-Catahoula Lake area. Localized areas are also located in northeast Texas and northwest Louisiana. The mainstem of the Ouachita is significantly affected by this tributary pollution.

Localized areas of dissolved oxygen depletion and unsightly conditions resulting from untreated or inadequately treated sewage and industrial wastes occur downstream from these discharges at numerous locations within the Lower Red River Basin. These locations, cited as "A" priority needs in Section II of this report, are areas where aesthetics are degraded and propagation of fish and recreation uses are damaged.

A number of the streams in the Lower Red River Basin are highly colored and foam as the result of paper mill effluents being released to them. Principally, but not exclusively, affected are Bayou Bodcau and Dugdemona Bayou. These conditions degrade the aesthetics of the affected streams and limit their usefulness for recreation and municipal and industrial water supply.

During the five years, 1962 through 1966, nine fishkills ranging in intensity from light to heavy have occurred in Cypress Creek and Lake O'the Pines Reservoir downstream from Daingerfield, Texas. All were attributed to industrial wastes containing metals or chemicals. These materials were present in concentrations toxic to fish. Indications are that this pollution resulted from the release of inadequately treated wastes from the steel industry in the Daingerfield area.

Extreme variation in temperature and dissolved oxygen content in the waters downstream from the various hydroelectric power projects in the basin result in damage to the stream environment for fish, particularly trout and small-mouth bass. These fisheries have year-round capabilities in these stream reaches, but for the water quality variations resulting from reservoir operations.

Considerable agricultural development in the region bounded by the west bank of the Ouachita and the east bank of the Mississippi is the source of other pollutants to the Ouachita. The tributaries in this area such as Bayous Bartholomew, Bouef, and Macon have water of high quality, and furnish some irrigation to the crops grown in the area. Silt and pesticides from quick runoff periodically pollute these streams and subsequently the Ouachita River. Numerous fish kills are reported from the use of pesticides, principally on the cotton crop.

The Red River Backwater Area shown on Figure 1 presents a particularly complex water quality situation. In this area, the annual

inundation from the Mississippi and Red Rivers' overflow produce favorable areas for propagation of fish ard excellent wintering ground for ducks and other waterfowl. Drainage resulting from navigational and flood control projects have altered and will alter the quantity and quality of the water resource in this area and in many cases damage the usefulness of the fish and wildlife resource

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